

# Inventions & Innovation Project Abstract

## Electrochromic Devices Deposited on Low-Temperature Plastics by Plasma Enhanced Chemical Vapor Deposition

Windows make up approximately 13 percent of wall area in new residences, 50 percent in large office buildings. Electrochromic windows (or 'smart windows') have been identified by the Basic Energy Sciences Advisory Committee as an import technology for the reduction of energy spent on heating and cooling in residential and commercial buildings. Electrochromic materials have the ability to reversibly alter their optical properties in response to a small electric field. By blocking the ultraviolet and infrared radiation, while modulating the incoming visible radiation, electrochromics could reduce energy consumption by 1 to 2 Quads ( $10^{15}$  BTU) per year. This amounts to several percent of the total annual national energy expenditures.

CMD Research, LLC propose depositing the electrochromic device on clear, flexible polymers using plasma-enhanced chemical vapor deposition (PECVD). This is an advanced technique commonly used in the semiconductor industry for its inherent low-cost and scalability. PECVD has been proven an effective technique for depositing all five oxide layers that make up an electrochromic device. The flexible device could be laminated onto glass in the final form of a cost efficient product. Owners of existing houses and commercial buildings can use this technology without the expense of replacing windows.

Additionally, the cost savings of this product over current technologies have the potential to make smart window technology much more pronounced in the window marketplace.



### Contact

*CMD Research, LLC*



U.S. Department of Energy  
Energy Efficiency and Renewable Energy